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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,023	01/23/2004	Jae Yeong Park	2080-3-218	7950

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EXAMINER
SAINT SURIN, JACQUES M

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/764,023	PARK ET AL.
	Examiner	Art Unit
	Jacques M. Saint-Surin	2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01/23/04*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-12,14-18 and 21-23* is/are rejected.

7)☒ Claim(s) *4,5,13,19,20 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "10 " and "100" on page 8, lines 20 and 21, have both been used to designate sensor chip. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "10" has been used to designate both sensor chip (page 10 of the specification) and membrane layer (page 14 of the specification). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by

the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 6-9, 11, 14-15 and 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Drees et al. (US Patent 5,932,953).

Regarding claim 1, Dress discloses a material sensing sensor using a thin film bulk acoustic resonator (TFBAR) (a bulk-acoustic wave piezoelectric resonator 20 is used as a sensor to detect the existence of a given material, see: col. 4, lines 15-17, Figs 1A-1B, and 5A-5B) comprising:

a first thin film bulk acoustic resonator (sensing resonator 50, see: col. 7, line 3, Figs. 5A-5B also shows resonator 72) for generating a first resonant frequency according to the amount and/or thickness of a target material (see also col. 7, lines 50-59); and

a reference thin film bulk acoustic resonator (reference resonator 52, see: col. 7, line 4 and Figs 5A-5b shows resonator 74 as reference resonator) for generating a reference resonant frequency.

Regarding claims 2-3, Drees shows a first channel pattern formed on the first resonator 72 and receiving the target material and a second channel pattern formed on the reference resonator 74, see: Figs. 5a and 5b.

Regarding claims 6-7 and 21-22, Fig 5b shows substantially the claimed invention as follows: substrate (78);

a membrane support layer formed on the substrate (80);

a common lower electrode formed on the membrane layer (area above item 80 of Fig. 5b);

a piezoelectric material layer formed on the lower electrode (layer 76);

first and second upper electrodes (88 and 92);

a reactive layer (84) formed on the first upper electrode (88), see: Fig. 5A; and

a chamber structure formed to expose the reactive layer and a portion of the second upper electrode (98, see:Fig. 5A).

Regarding claims 8-9, Drees discloses for instance, two or more three-port TFR devices each having a sensing resonator and a reference resonator can be monolithically fabricated on one substrate (col. 8, lines 59-61). Drees further discloses the general structure of the monolithic sensing/reference resonator combination described above can be used to fabricate sensing devices with more than two resonators on a given substrate 9col. 8, lines 55-59.

Regarding claims 11 and 14-15, as discussed above, they are rejected for the reasons set forth for claims 12 and 23. Furthermore, Drees discloses a signal processor (phase detector 36) that includes a double mixer 44.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 10 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drees et al. (US Patent 5,932,953) in view of Ueyanagi et al. (US Patent Application Publication 2002/0017138 A1).

Regarding claims 10 and 16-18, Drees does not disclose a sensor chip package having bonding pads connected to the sensor chip, external connection pins connected to the bonding pads and a structure for protecting and supporting the sensor chip. Ueyanagi discloses the semiconductor sensor package is a package for incorporating a semiconductor sensor chip characterized in that a main surface for mounting the semiconductor chip is formed at a predetermined angle with respect to the surface of a printed circuit board mounting the package, the main surface is provided with a plurality of terminals along two opposite sides thereof for connecting with input/output terminals of the semiconductor sensor chip, a bottom surface perpendicular to the main surface is provided with a plurality of pins respectively formed along the two sides parallel to the main surface, which plurality of pins are inserted into mounting holes formed on the printed circuit board, and the plurality of terminals and the plurality of pins are electrically connected along two side surfaces sandwiching the main surface, see:

page 5, paragraph 0085. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Drees the techniques of Ueyanagi because since mounting of the sensor chip package is possible by inserting pins into the printed circuit board, direction of the physical value to be detected and direction of the sensor chip can be positively positioned in a single direction, thereby improving reliability of the detection signal.

7. Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drees et al. (US Patent 5,932,953) in view of Wohltjen (US Patent 4,312,228).

Regarding claims 12 and 23, Drees discloses the sensing oscillator the reference oscillator, a mixer 44 and a power measuring unit, signal mixer, however, it does not disclose a radio frequency mixer. Wohltjen discloses the outputs of the surface acoustic wave are fed to a double balanced mixer having radio frequency, see: col. 8, lines 23-26. It would have been obvious to one having ordinary skill in the art at the time of the invention to substitute the mixer of Drees for that of Wohltjen because it would produce a measurable voltage change in the mixer signal in a reliable manner.

Allowable Subject Matter

8. Claims 4-5, 13, 19-20 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Larson, III et al. (US Patent 6,651,488) disloses systems and methods of monitoring thin film deposition.

Larson, III et al. (US Patent 6,668,618) discloses systems and methods of monitoring thin film deposition.

Webber (US Patent 5,864,261) discloses multiple layer acoustical structures for thin-film resonator based circuits and systems.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M. Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Mondays through Fridays 10:30 A.M. -7:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272 2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Jacques M. Saint-Surin
July 07, 2005

DANIEL S. LARKIN
PRIMARY EXAMINER